Genotypic differences in architectural and physiological responses to water restriction in rose bush

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Résumé en anglais	The shape and, therefore, the architecture of the plant are dependent on genetic and environmental factors such as water supply. The architecture determines the visual quality, a key criterion underlying the decision to purchase an ornamental potted plant. The aim of this study was to analyze genotypic responses of eight rose bush cultivars to alternation of water restriction and re-watering periods, with soil water potential of -20 and -10 kPa respectively. Responses were evaluated at the architectural level through 3D digitalization using six architectural variables and at the physiological level by measuring stomatal conductance, water content, hormones [abscisic acid (ABA), auxin, cytokinins, jasmonic acid, and salicylic acid (SA)], sugars (sucrose, fructose, and glucose), and proline. Highly significant genotype and watering effects were revealed for all the architectural variables measured, as well as genotype × watering interaction, with three distinct genotypic architectural responses to water restriction – weak, moderate and strong – represented by Hw336, 'Baipome' and 'The Fairy,' respectively. The physiological analysis explained, at least in part, the more moderate architectural response of 'Baipome' compared to 'The Fairy,' but not that of Hw336 which is an interspecific hybrid. Such physiological responses in 'Baipome' could be related to: 1. the maintenance of the stimulation of budbreak and photosynthetic activity during water restriction periods due to a higher concentration in conjugated cytokinins (cCK) and to a lower concentration in SA; 2. a better resumption of budbreak during the re-watering periods due to a lower concentration in ABA during this period. When associated with the six architectural descriptors, cCK, SA and ABA, which explained the genotypic differences in this study, could be used as selection criteria for breeding programs aimed at improving plant shape and tolerance to water restriction.
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